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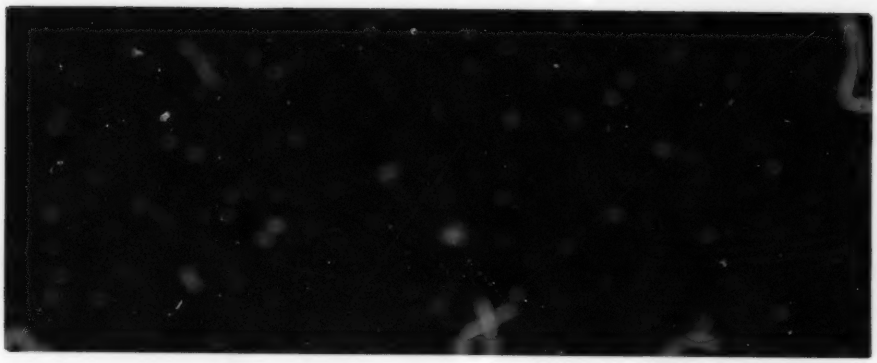

Keeping the agriculture and food industries competitive through Research, Development and Demonstration.

Final Report

2.4-35

Virological Investigations into Outbreaks of Atypical Diarrhea in Calves an Piglets

Conducted by
Canada/Saskatchewan ERDA

Funded by the Agriculture Development Fund

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FINAL ~~PROGRESS~~ REPORT: 28 SEPT 1989
CANADA/SASKATCHEWAN ERDA PROJECT # 2.4 - 35

PROJECT: "VIROLOGICAL INVESTIGATIONS INTO OUTBREAKS OF ATYPICAL DIARRHEA IN CALVES AND PIGLETS"

This project has had to be terminated due to the resignation of the chief investigator from the Department of Veterinary Microbiology, who has undertaken a long term consultancy with CIDA in Indonesia, commencing at the beginning of October, 1989.

Because of the short time left before departure for Indonesia, work on this project was reduced so as to allow completion of another ERDA sponsored project into respiratory disease in cattle (see separate report for project #2.4 - 25).

The need to terminate the project is regretted, but was unavoidable. Work carried out to date on this project is as follows.

RESULTS

A: Investigations into the Breda-virus like particles have continued. Because one report suggested that human Bredavirus was able to be cultured in a human rectal carcinoma cell line, attempts were made to culture the bovine Breda-virus like particle using freshly established lines of bovine intestinal epithelium cells. Various media were used, including basic media and media supplemented with low levels of trypsin and bile salts. Though some suspicious cytopathic effects were seen during serial passage in this system, no definite evidence was seen that the virus was propagating in this system.

The Bredavirus-particle was found to hemagglutinate rat erythrocytes, similar to that previously reported in the literature. The density of the Bredavirus-like particles was determined by isopyknic density gradient centrifugation in cesium chloride, and was found to be very similar to that previously reported in the literature. However, the hemagglutinin associated with the particles was found to be somewhat less dense, and may

represent a separate particle or a fragment derived during processing.

Immune electron microscopy showed that the local particles did not react with either of two antisera obtained from Dr G N Woode at Iowa State University. It is possible that local strains represent a different serotype.

The Bredavirus-like particles continue to be detected in diagnostic samples, and will continue to be monitored during routine diagnostic investigations.

B: The results of the primary investigations into viral content in feces and intestinal contents from calves and piglets with outbreaks of diarrhea have been written up into a paper which has been accepted for publication in the Canadian Veterinary Journal. A copy of the title page and abstract is enclosed, summarizing the relevant findings of the investigation.

EXPENDITURE

No items have been purchased with an individual value greater than $500.

A statement of expenditure is being prepared by the Research Accounts section of the University of Saskatchewan, and will be forwarded shortly.

CONCLUSION

Investigations have revealed a number of viruses associated with diarrhea in calves and piglets. Some of these do not appear to have been reported before in Canada, and one appears entirely new in terms of enteric disease. Impending publication of these findings will give useful guidance to other diagnostic laboratories in Canada into their investigations into enteric disease in calves and piglets, and may assist in development of control measures against enteric disease in these species.

Peter J.K. Durham
(Chief Investigator)

VIRUSES DETECTED DURING ELECTRON MICROSCOPIC EXAMINATION OF FECES FROM CALVES AND PIGLETS WITH DIARRHEA.

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ABSTRACT

A total of 763 feces or intestinal samples from diarrheic calves and piglets were examined for viral content by immunofluorescence, electron microscopy or cell culture. Routine fluorescent antibody and cultural tests detected rotavirus (n=126), coronavirus (n=80) and BVD virus (n=13). Electron microscopy detected further rotaviruses (n=24) and coronaviruses (n=17) that did not react with the standard fluorescent antibody tests. Other viruses detected by electron microscopy included Breda virus-like particles (n=49), astroviruses (n=1), caliciviruses (n=1), rhabdoviruses (n=1), parvoviruses (n=2), enteroviruses (n=3), togavirus-like particles (n=2), and "chained" particles (n=5). Mixtures of several of the viruses were detected in a number of feces.

The survey emphasized the value of electron microscopy as a broad spectrum diagnostic tool.

Keywords: Electron microscopy, calves, piglets, rotavirus, coronavirus, Breda virus, astrovirus, calicivirus, rhabdovirus.